1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

[137] *arijeri*, the oleander. This plant is important in the manufacture of magical concoctions.
[189] Laoust [1] and Justinard [2] support this identification.

tuzselt, a bush resembling a high-bush blueberry. It bears a red pod, like a rose-pod,
[262] which is eaten. Laoust [3] calls this *Fraxinus dimorpha*.

[314] *aghanim*, a reed, used extensively in basket making. Laoust supports this identification.[4]

tharugwith, a bush with a red flower, much frequented by bees.

[278] *zui*, a bush bearing a white flower, with peppery-tasting leaves. The latter are used as medicine for stomach-ache.

[365] *r-knuafer*, a bush or low tree which produces a bud resembling a clove. The buds are put into tea as a spice, and are used as a stomach-ache cure for children.

[278] *azir*, a bush the leaves of which are used in the brewing of a tea alleged to be beneficial in fever.

[151] *izarshi*, forsythia. Women cut pieces of its stem and tie them in their belts to prevent boils. This identification is purely personal and lacks confirmation.

[262] *thakhfa*, a wild rose, the pods of which are sometimes eaten in times of famine. Hanoteau and Letourneau [5] give *Rosa sempervirens* for the Kabyle *thaqfert*.

Luxurious forests of conifers are said by the inhabitants of the country to have once covered most of the region, but today they are confined to the mountains of Beni Bu Nsar, Taghzuth, Beni Khennus, Beni Seddath, Ktama, Zarket, and the upland reaches of Mtiwa. Patches of this forest remain on Mt. Kuin in Gzennaya, in parts of Beni Amart, at Aswil, where the Nekor passes from the Gzennaya into Beni Urriaghel, and on the crests of Beni Tuzin. The *taidha* grows chiefly in the Senhajan tribes, but the *thuya* is found not only there but also farther to the east, in Gzennaya and Beni Tuzin.

After climbing from the hot barrenness of the eastern Rif, one finds the forests of the Senhaja Sghir most beautiful and satisfying. On the mountain between Beni Bu Nsar and Taghzuth, it is difficult to realise that one is in Morocco. The whole of this section reminds one of temperate forests, such as are found in the northern United States and Canada; especially is this true in the long, flat plateau-valley of Beni Seddath, where a lush meadow is variegated with frequent clumps of *taidha*. Even in midsummer this region retains an exhilarating chilliness of atmosphere. (See plate 1.)

CLIMATE

● 132 The slopes of the Mediterranean border of this region are rugged, mostly deforested, hillsides, with a climate similar to northern Mexico or our own Southwest. Farther to the east, in the tribes of Beni Said, Beni Ulishk, Tafersit, and parts of Galiya, the country becomes rolling and its slope relatively gentle, and grain is grown on it without terracing or irrigation. Farther south, however, stretches the arid expanse of the Garet, that waterless
137 waste whereon the Metalsa and Beni Yahyi shift about from camp to camp. This desert stretches into parts of Beni Said and Galiya, and oversteps the boundary of Beni Ulishk and Tafersit. Here in the Garet grows a sparse crop of grass, and quantities of that coarse grass called *halfa*, resembling our own marsh or beach grass, from which the nomadic peoples, and the Gzennaya and other Riffians as well, make sandals, pack-saddles, ropes, and all sorts

containers.

[1] Page 454.
[2] Page 136.
[3] Pages 493, 499.
[4] Page 453.
[5] Page 48.

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

300 312 132

of containers. Water is so scarce in the Garet that the Metalsa and Beni Bu Yahyi are accused by the other Riffians of giving their food-vessels to dogs to lick rather than washing them. (See plates 2 and 3.)

In the Garet during summertime the heat rises unmercifully, to such a temperature that it seems difficult to endure; in winter cold winds blow across it, and although the ground does not freeze and snow rarely falls, the inhabitants feel considerable discomfort in the flimsy shelter of their tents.

Winter snow falls regularly in Gzennaya, Beni Tuzin, Beni Urriaghel, Beni Amart, throughout the Senhaja Sghir, and in parts of the Ghomara, as well as in the Arabophone Senhaja. On Christmas day, 1926, several inches of snow fell at Ajdir, on the Bay of Alhucemas. In the valley of Beni Bu Nsar every winter the brook freezes over, and its course is obscured by several feet of snow, which smooths off the contours of the terraces; Taghzuth is almost as hard hit, and Beni Seddath and Beni Khennus are under snow for over four months of the year, while in Zarket the snowfall is so great that a whole column of Spanish troops perished in ten-foot drifts in November, 1926. The Spaniards occupying the posts in the Senhaja Sghir have organized a ski troop, composed of Riffians who, during the last two winters, have become adept in this new method of locomotion. (See plate 1.) Both the Riffians and the Senhajans seem perfectly acclimated to the snow, from a physical standpoint. They do not seem to mind the cold as much as do Europeans, and frequently walk for hours in the snow barefoot.

The Beni Bu Nsar, Beni Khennus, and Beni Seddath are as accustomed to snow as are we in New England, and endure a climate in no wise less rigorous.

FAUNA

136

As far as can be determined, no competent zoölogist has worked in the region discussed in this volume. Because of the inaccessibility of the country such a lacuna is not surprising. It is therefore with hesitation that one not versed in zoölogical classifications attempts to catalogue the animals found there. I have made a list of the mammals commonly known to the Riffians, with their Berber and Arabic names and their descriptions. By comparing these names with those given by Hanoteau and Letourneau for Kabylia and checking the descriptions with Dr. Glover Allen of the Zoölogy Department of Harvard University,[1] and by looking them up in Flower and Lydekker, I have arrived at tentative conclusions as to the identities of most of them. My guesses as to species should not be taken as premature and groundless identifications, but rather as suggestions intended to stimulate zoölogical interest in that area.

Mammalia

Ungulata

tighaidat u wazghar (Arabic *ghazal*), the gazelle. This animal is found in the flat arid regions west of the Muluya, in the tribes of Metalsa, Beni Bu Yahyi, Galiya, Kebdana, Beni Said, Beni Ulishk, and Beni Tuzin, and in southeastern Gzennaya.

Gazella mhorr and *G. dorcas* are common in Morocco, also *G. isabella*.

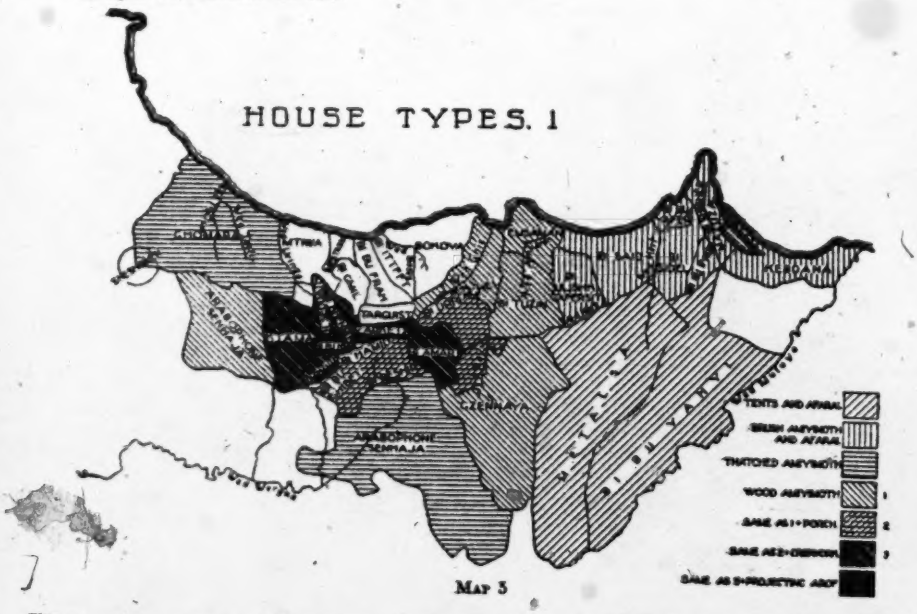
[1] Dr. Allen has kindly gone over this section in proof, making numerous additions and corrections.

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

342 ben Aïssa, Mountain Urriaghel, Beni Amart, Iherrassen, Zarket, Beni Mesduy, Targuist, all the Senhaja but Branes, and the Ghomara.

alim (Senhajan dialect), thatching as applied to roofs. Thatched roofs are distributed through Branes, Beni Krama, Khunduktamda, Beni Koraa, Ulad Azam, Bu Adl, Bab Wendar, Muziet, Ain Mediuna, Beni Bu Nsar, Beni Khennus, Beni Seddath, Beni Gmil, Zarket, Targuist, Beni Mesduy, Western Arabophone Senhaja, and the Ghomara.

er wakth (from the Arabic word meaning paper) are shingles split from cedar or pine logs and used for roofing. They are found in the Senhaja Sghir. When wood was more plentiful, shingles were used in the Rif.



MAP 5

adrim, cork, used for roofing. Cork roofs are found in the Senhaja Sghir except Beni Mesduy, in Western Arabophone Senhaja, Beni Krama, Khunduktamda, and Zrarka. The same peoples who use it for roofing often sleep on and under it, substituting it for blankets and mattress. Mud roofs are found throughout the Rif except among the tent-users, and in the Ghomara.

Cribwork of wood, or beams laid horizontally in the masonry. This construction strengthens the walls in regions where the snowfall is heavy enough to endanger them. (See plates 18 and 19.) It is found in Taghruth, Beni Bu Nsar, Beni Khennus, Beni Seddath, Ktama, Zarket, and Beni Amart.

342 ●132 *amiyimath*, or sheathing. A sheath is sometimes set under the eaves of houses, and sometimes on the sides, or on the ends in the case of flat-roofed houses, to protect the masonry

1: Coon E-5 (1926-1927) 1931 MX3 Rif MX3

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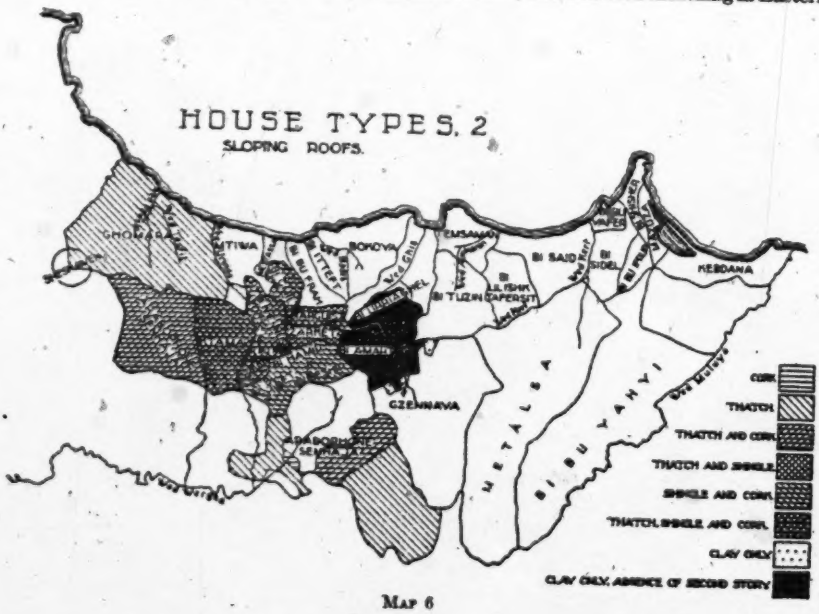
[132]

against the *shurrĭhuth*, a desolating icy wind, accompanied by rain and sleet, which strikes the Rif, particularly the mountain tribes, in winter time. (See plate 19.) Without this sheath the wind and rain would weather out the mortar and the stones might fall. There are three kinds of sheathing: the wooden type, made of planks nailed over the masonry; the brush type, made of a peculiarly dense species of bush, tied to the exposed area; and a type made of thatch. Wooden sheathing is used in Beni Tuzin, Temsaman, Beni Urriaghel, Gzennaya, Beni Amart, Senhaja Sghir, and Western Arabophone Senhaja; brush sheathing in Galiya, Kebdana, Beni Said, Beni Ulishk, and Tafersit; and thatched sheathing in Eastern



MAP 6

Arabophone Senhaja and the Ghomara. The Nomads and Bokoya, and the Maritime tribes, use no *amiyimoth*.

el asha (Arabic), a very flimsy, poorly constructed house used in the Ghomara, along with masonry houses. This structure is made of a pole frame tied together in rectangular shape, with a pitch roof; walls and roof are thatched with straw. The thatching is inferior to the Senhajan work.

Circular straw huts,[1] such as are so commonly seen along the roads in the French Zone of Morocco (see plate 22), are never used in the Rif, Senhaja, or Ghomara, excepting in Branes, where, since the war, several of them have been built as makeshift or temporary

[1] These are the *mapalia* referred to in ancient documents. See Oric Bates, *The Eastern Libyans*, p. 167.

3: Hart E-5 (1953-1954)1954 MX3 Rif MX3

101 their archaic Berber cultural patterns in the face of an ever-increasing Arabization. For this reason, I use the Berber term *Aith* (sons of) rather than its Arabic equivalent *Banī*, which has become current in the literature. Although a tribesman who does know Arabic will say *Banī* when speaking of his tribe to a stranger, he will employ *Aith* when in conversation with his own people. I have also singled out the tribe of Aith Wuryāghil as the object of this article not only because, at the time of writing, I know it much better than the other Riffian tribes, but because, as it is the largest and most powerful of all of them, it has always taken the leading role in the past history of the Rīf, and it has, on most occasions, called the turn to the other tribes when necessary. The presence of Aith Wuryāghil, with that of Iznāya, in the confederation of the Ṣinhāja during the great Ṣinhāja-Ghumāra war was what won that war for the former group; and in recent times the tribe produced ʿAbd al-Karīm, of whom we shall say more later on.

133 Running in a northeast-southwest direction, the tribal territory, 1028.5 square kilometers, consists, in the north, of an open alluvial plain bordered on the east by the mountains of Tamsamān; this plain overlooks the Mediterranean and forms the Bay of Alhucemas. Further south it gradually ascends into and merges with the brown, barren and eroded mountains which are such a characteristic feature of the Riffian landscape; these are bisected by arroyos and high valleys, and in Aith Wuryāghil they culminate in the rugged massif of Jabal Ḥammām (1948 meters), which is covered with snow in [137] January and February. Vegetation consists largely of scrub and 132 lentiscus bushes. Except in the highest altitudes, rain is infrequent even in the winter; the so-called «levante», coming from Spain, brings it suddenly and in the form of flash floods, which change the two sluggish rivers in the tribal territory, the Ghīs to the west and the Nakūr to the east, into raging, torrents. In the mountains the winters, although not long, are cold, but snowfall is much less than in Aith ʿAmmarth or in the Ṣinhāja Srair to the southwest, where the mountains are considerably higher. The rest of the year the climate is warm and usually so dry as to produce only a bare subsistence economy.

15. THE QANUN OF THE LOWER GHIS RIVER (AITH WARYAGHAR):

312 [133] From this river, the longest of those which bathe the Central Rif (more than 70 km.), as with its companion and eastern neighbor the Nkur, only the surface waters are used, and very imperfectly, by the Rifians in the small meanders which its narrow basin forms. For the [648] Rifians there is too much water and not enough land. Up to the present, the Spanish protectors have not attempted the slightest modification nor the study of the Ghis basin and its regimen with utilitarian ends in mind. It is a wealth which, like so many others, is lost. There is too much water and nevertheless the Rif is thirsty. [132] The Rifian spends the whole year looking at the sky, an attitude which has become contagious to the protectors, imploring a few drops to fall in order to save his miserable <u>winter</u> (author's italics) harvest[125].....

In all the long basin of the Ghis one does not perceive the handiwork of man. Neither bridges nor acqueducts, neither dams nor any [487] installations to raise up its waters. Paths wind along its pebbly and steep banks to hide themselves in the dried-up stony bed. Small [402] and winding irrigation furrows timorously make haste to return suddenly the flow which they secretly absorbed, under the shelter of thickets, after (providing water to) move some small and rudimentary turbine mill. Only at the height of Targist, military techniques with their transportation of water give such a pessimistic sight a chance to change. 312 133 It is necessary to descend kilometers and kilometers down the steep bed of the river, to about some three kilometers from where it empties

671 and, second, diligence, both of which are qualities also needed by
224 judges of The Law[189], who, in order to manipulate their terrible
692 weapon, the pen, need attitudes of repose, and sheltered places where they can keep their books and papers and even hide their faces.

224 Incidents which arise during hunts are examined most often
578 by passing them to the mulu' of the same hunting party. He settles
627 them on the spot, giving his judgment on the matter, and in the
614 event that the question must go up in front of the imgharen, the latter limited themselves to doing their duty and to putting into effect the opinion of the mulu', a natural arbiter.

224 Thus it had to be; and if, for example, there was a hunting
578 incident in the snow, the best possible proof of which was individual
627 tracks or footprints, this required, on the part of the judge, dili-
695 [132] gence in copying or studying before it was rubbed out.

224 The usual sanction, all over the Rif, for hunting incidents
681 is a fine of 25 pesetas.[190]

[128] For the examination of different cases which tend to come up often, we have grouped them in the following categories, which facilitate consultation even though they are somewhat arbitrary.

F) Game:

223 1) A bird knocked down in flight within the range of vision
671 of the hunters belongs to whoever hits it, until, having hit the ground, it flies up again, in which case, and if it is not wounded again, it belongs to whoever catches it.

223 2) If a bird or animal is hit simultaneously by several hunters,
224 it belongs to whoever catches it; and if several people should catch it
671 at once, it is divided among them (Aith 'Ammarth).

633 [504] The area is administered today from the small port and provincial capital of Alhucemas. The growth of this urban center, fishing port, and tourist attraction is but a recent [175] phenomenon. The city, founded in 1925 with the invasion of a Spanish fleet, has been the focal point for whatever innovation that has occurred in the Central Rif in this century.

133 361 Directly behind the city of Alhucemas is a flat plain. Although the land here is rich it was uninhabited prior to the Spanish because the terrain was indefensible during times of feuds. The original population was situated in the foothills [712] and higher mountains. Here homesteads were scattered and since they also served as garrisons or fortresses they were located on hills or ridges which could be defended militarily.

133 The area is not well served by rivers, the principal ones being the Rhis and the Nekor. The former rises in the Sonhaja area and empties into the Mediterranean at Alhucemas. The latter starts in Igzinnayen territory to flow along the border of the Beni Wariyaghar and the Beni Tuzin, emptying into the bay at [312] Alhucemas. Both these rivers and their tributaries are used [161] for irrigation and the population density is higher along them. There are also a good many natural springs (generally regarded as holy sites) and wells have been successfully dug in some of the valleys.

132 Rainfall varies annually and at times disastrously. At the weather station in Alhucemas during the decade 1946-1955, rainfall ranged from 8.5 inches to 16.9 inches. Although the

6: Joseph E-5 (1965-1966) 1975 MX3 Rif MX3

132 mean would be somewhat higher in the highlands, the range of
[243] variation would be as great. Since the economic backbone of the area is the dry farming of cereals, low rainfall or drought causes serious difficulties.

175 The history of the Rif presents us with the strange paradox that it is better documented for the eleventh and twelfth centuries than for the nineteenth. We have several written chronicles of the Arab city states established along the Mediterranean, such as Nekor which drops out of history in the eleventh century, and Bades which was captured by the Spanish in the
[113] sixteenth century. Of the Berbers in the hinterland we have little material with the exception of el-Badisi's Lives of the Saints of the Rif (French translation by Colin, 1926) dated 1311, and el-Bekri's Description de l'Afrique septentrionale from the
[131] eleventh century. El-Bekri notes that already in that time most of the present tribes of the Rif were located in their present
[648] sites (Michaux-Bellaire, 1925: 180-181). Between these accounts, fragmentary at best, and the uncritical chronicles of Spaniards leading punitive expeditions in the late nineteenth and early twentieth centuries, Riffian history is rather blank.

175 Geographical circumstances made the Central Rif peripheral
648 to most events going on in Morocco. Only with the insistence of the Spanish government did the Moroccan Sultan send an expedition into the Rif in the late nineteenth century to punish the Ibuqquyen for piracy. During the early years of the present

7: Mikesell K-4,5 (1955-1957) 1961

MX3 Rif MX3
Jebala MX2
Senhaja MX4

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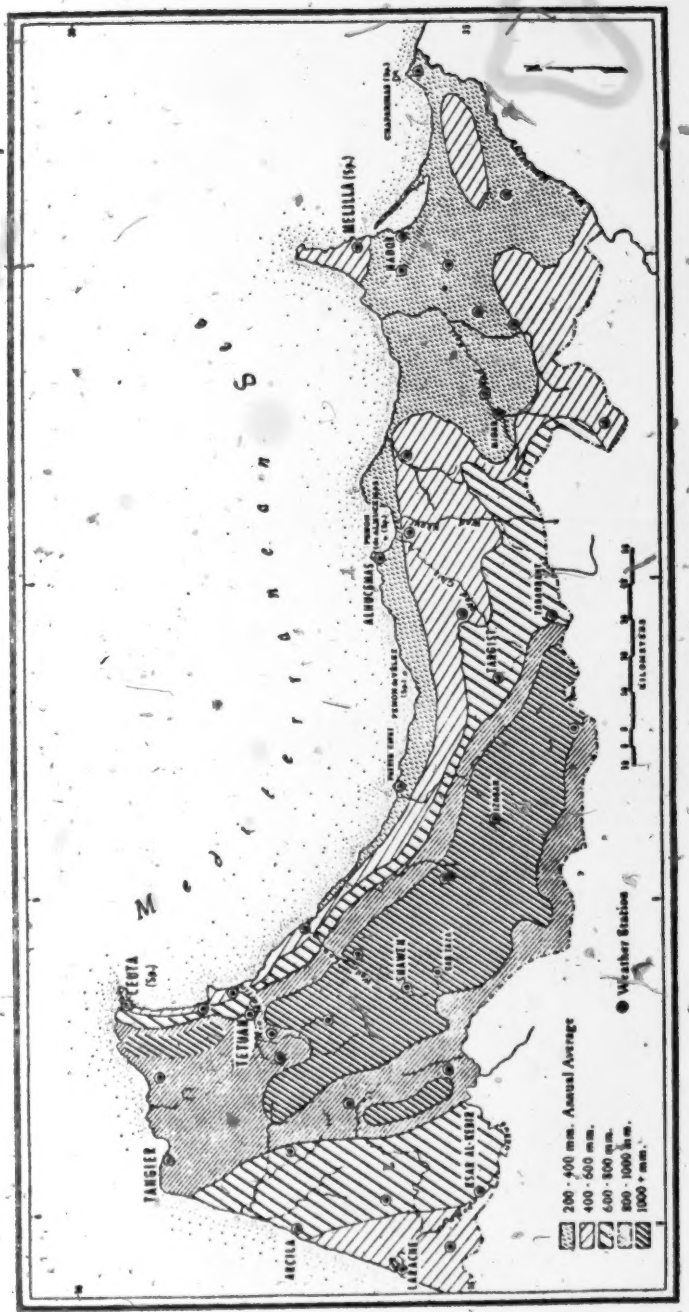

Fig. 6. Northern Morocco: precipitation, 1941-1955.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

133 Spartel as far as the western flank of Jbil Musa. Today this coast commands one
133 of the world's great trade routes. For the Ancients the Pillars of Hercules marked
175 the end of the known world, the very limits of civilization. In medieval time the Arabs rarely ventured into the Atlantic, and in the great age of exploration the Occidental Muslims limited their activity to piracy. For Morocco this coast has been a bond with Spain. By this almost terrestrial function the Strait of Gibraltar assumed a decisive role in Moroccan history. It was to guard the southern flank of Betica that Emperor Claudius created the province of Mauritania Tingitana in A.D. 46. The proximity of the two shores allowed Islam to conquer the Iberian peninsula, and the Spanish, in turn, to extend their influence to the Moroccan coast.

133 On the Mediterranean coast Morocco faces the great highway of civilization,
[504] but that shore, almost completely devoid of shelter, has never had an important maritime activity. A few fishing boats operate on calm days, but their sole function
[487] is to carry nets and seines a short distance beyond the surf. No road or trail
[491] of any significance follows this coast. Immediately east of the delta of Río Martín (Wad Martil) the coastline consists of a series of high cliffs cut by deep barrancas (pl. 1, *a*). This pattern, except for the small coastal plain formed by the deltas of Wad Ghis and Wad Nkour, continues as far as Melilla.

Climate

132 The climate of northern Morocco is of the Mediterranean type. In its simplest form this type of climate is characterized by (1) concentration of precipitation in winter and spring, the summers being nearly or completely dry; (2) warm to hot summers and mild winters; and (3) a high percentage of the possible sunshine for the year. From the Atlantic coast eastward to about 4° west longitude,
[243] [312] irrigation is unnecessary for cereal crops. Within this zone the average annual precipitation ranges from 400 mm. to more than 1,000 mm. The extent of this range reflects the extreme contrasts of exposure and elevation. The drier zone, with precipitation totals of 400 mm. or less, begins on the eastern edge of the Rif chain.

[127] Figure 6 was compiled from published records of forty-five weather stations for the decade 1946–1955. The former date is the earliest that can be used if conditions in the entire zone are to be compared. The records of a few stations extend to earlier years, and the Catholic Mission in Tangier has recorded weather observations since 1912. But data have become available for the interior of the zone only since the end of the Second World War.[1]

Precipitation decreases from north to south on the Atlantic coast, and from west to east on the Mediterranean coast. Tangier, with 810 mm. (31.9 in.), is the wettest coastal station in the zone. At Arcila, only 40 km. to the south, the total is 611 mm. (24 in.). On the Mediterranean coast, Ceuta with 560 mm. (22 in.) contrasts with Wad Lao with 460 mm. (18.1 in.), Puerto Capaz with 330 mm.

[113] [1] For observations recorded prior to 1944, see *Resumen de las observaciones meteorológicas efectuadas en la zona de Marruecos hasta 1944* (Tetuán: Imprenta del Majzen, 1946). The years 1944–1946 are covered in a supplement published in 1947. Since the latter date, weather records have been published monthly in the *Boletín Mensual Climatológico del Servicio Meteorológico en Marruecos* (Tetuán: Imprenta del Majzen). For data on precipitation elsewhere in Morocco see *Atlas du Maroc*, Planche 4 *a*, "Précipitations annuelles" (Rabat: Comité de Géographie du Maroc, 1958), and the "Notice explicative" that accompanies the map.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

(12.9 in.), and Alhucemas with 315 mm. (12.4 in.). The area of heaviest precipitation runs along the line of the Rif chain. Because of the orographic mechanism, highland areas receive more precipitation than adjacent lowlands. No records exist for the highest altitudes, but annual rainfalls totaling more than 1,500 mm. (59 in.) may be surmised. The amount recorded at Bab Taza—1,315 mm. (51.7 in.)—suggests very heavy precipitation on Jbil Tisuka and Jbil Leshab. In the Sanhajan highlands, Izagan, at an elevation of 1,500 meters, has 1,414 mm. (56.6 in.) and Tabarrant, at 1,140 meters, has 1,199 mm. (47.2 in.) of precipitation. On the highest peaks of the Sanhajan highlands the rainfall may average 2,000 mm. per year. In areas higher than 1,500 meters some snow falls during the winter months. Peaks above 2,000 meters are snow-capped from the middle of November to the end of May.

The rainy season begins at about the same time throughout northern Morocco, but the amount of precipitation varies notably. The meridian running through Targist marks the division between the wetter and drier parts of the northern zone. Targist receives 423 mm. (16.6 in.) of precipitation. At Midar, 65 km. farther to the east, the total is only 281 mm. (11 in.). At Melilla the precipitation is 414 mm. (16.2 in.), but no other station in the eastern lowlands regularly records more than 350 mm. (13.8 in.). The sharp decrease in amount of precipitation east of the Sanhajan highlands is one of the striking aspects of the geography of northern Morocco.

Annual variability in amount of precipitation is characteristic of all stations, regardless of whether the total is large or small. In the decade 1946–1955, precipitation at Arcila varied from 418 mm. (16.4 in.) to 850 mm. (33.5 in.); at Alhucemas the corresponding totals were 216 mm. (8.5 in.) and 430 mm. (16.9 in.). Variation of this magnitude is most noticeable in the drier eastern lowlands, where livelihood is based upon dry farming of cereals. During the same decade, annual precipitation at Midar varied from 105 mm. (4.1 in.) to 450 mm. (17.7 in.). The former year (1947) was one of great hardship, whereas the latter year (1955) was bountiful. The range of variation was just as large at Arcila, but the 1947 rainfall of 416 mm. (16.4 in.) did not mean failure of the cereal crop.

No part of this zone is more than 100 km. from the coast. Since marine temperatures tend to be relatively mild and to change but little from summer to winter, a corresponding mildness is characteristic of all areas into which sea air is regularly carried. Temperatures below freezing or above 35°C. (95°F.) are rare in the Atlantic coastal zone. The Mediterranean coast, because of the warmer water of the inland sea, is somewhat milder throughout the year than the Atlantic coast, which is affected by the cool Canaries Current. The highest summer temperatures are experienced in the Moulouya Valley, which is sheltered from marine air. In the mountains the highest summer temperatures occur on south-facing slopes, where temperatures may rise above 35°C. even at an altitude of 1,000 meters. Freezing temperatures are common at the same elevation during the winter months. It seems reasonable to suppose that winter temperatures may drop to –10°C. at an altitude of 2,000 meters.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

Drainage

132 133 Drainage basins are small in this area, for the watershed is close to the sea. The seasonal rate of flow follows the seasonal rainfall, but with a lag in time that varies with the slope, the vegetation, and the permeability of the rock. Spate follows rainfall where impermeable rocks form the basin, more slowly where the basin is of permeable limestone. All the Mediterranean streams may be roaring torrents at some period from October to May; but most of them dry up during the long summer drought. The valleys of some of the larger streams, like the Ghis and Nkour, betray their Mediterranean regimen by a double bed: in summer a narrow channel is cut below the broad rocky shelf which is the winter bed. Wad Ouergha draws off most of the drainage from the Sanhajan highlands; it is the largest stream flowing from the Rif chain, and one of the sources of irrigation water in the Gharb coastal plain (fig. 1). The basin of Wad Lukkus includes most of the Atlantic drainage. Surface streams are rare in the calcareous zone. The only stream that flows through the limestone mountains is the Wad Lao, which follows an antecedent course; but Wad Hajara, Wad Khemis, and Río Martín (Wad Martil) are fed by springs issuing from the base of this range. The area between Wad Nkour and Wad Moulouya has only one large stream, Wad Kert, and it receives little nourishment after it leaves the highlands. Wad Moulouya, from the distant Ayache Mountains of the High Atlas, is northern Morocco's great exotic stream. This stream and Wad Lukkus constituted the only natural segments of the boundary between French Morocco and Spanish Morocco.

Plant Domains

137 The vegetation of North Africa can be divided into (1) a Mediterranean domain, where forest and shrubs predominate; (2) a domain of "steppe," where forest is confined to highland enclaves in the midst of a predominant cover of grass and herbs; and (3) a domain of highland vegetation, which includes a subalpine formation with some trees and, only in the Moroccan Atlas, an alpine formation [132] without trees. Saharan vegetation penetrates Barbary at only two points: in the Hodna basin of Algeria and on the plains extending inland from the Gulf of Gabès in Tunisia. Figuig, Ksar as-Suq, Zagora, and Goulimine, all within the political limits of Morocco, receive less than 200 mm. of precipitation per year, but the records of these stations do not show the variability indicative of true desert. The Moroccan territory south of the Atlas chains forms part of the "pre-Sahara" of French terminology.[1]

In terms of this classification, all but a small part of northern Morocco falls within the Mediterranean domain. No peak in the Rif Mountains rises above timberline, and only a small area can be called subalpine. Grassland is confined to one area on the eastern edge of the zone. This area, in the lower Moulouya Valley, is one of the driest parts of northern Morocco, but it is not certain that the presence of steppe vegetation can be attributed solely to meager precipitation. The dominant species is *Stipa tenacissima* (Arabic *alfa*). This hard tussock grass

[1] For a brief description of vegetation in all North Africa, see Jean Despois, *L'Afrique du Nord* (Paris: Presses Universitaires de France, 1949), pp. 80–96; and Louis Emberger, "L'Afrique du Nord-Ouest," *Unesco Arid Zone Research*, VI, "Plant Ecology" (Reviews of Research) (Paris, 1955), pp. 219–249. [113]

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

has deep roots, forms strong clumps, and its awns stick to the coats of passing animals. More important, it is palatable only for a brief period in spring.[1] Alfa grass is scattered over most of Garet, but is conspicuous only in the area between the hills of Ikbdhanen and Kar-Kar.

Forest, Maqui, Garrigue

The climate that has prevailed during historic time is such that trees ought to dominate the vegetation of this zone. As figure 7 indicates, *Pistacia atlantica*,

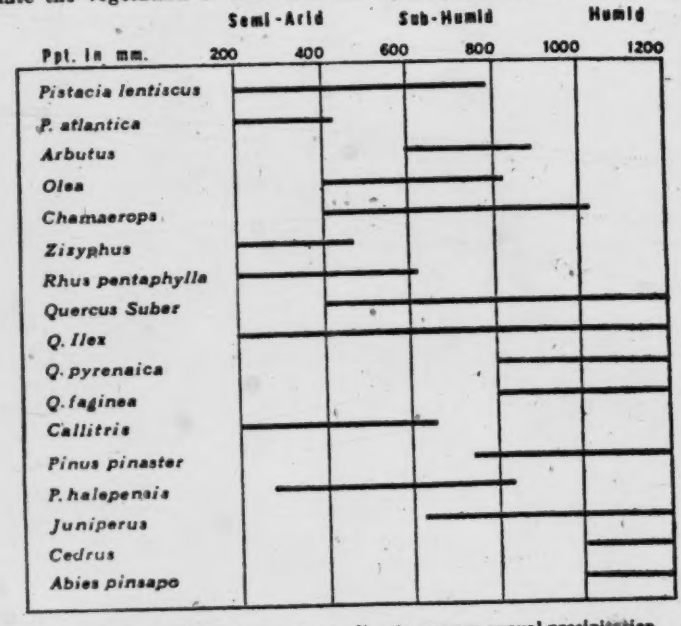

Fig. 7. Range of forest species according to average annual precipitation.

P. lentiscus, *Quercus Ilex*, *Pinus halepensis*, *Callitris articulata*, *Rhus pentaphylla*, and *Zizyphus lotus* can grow in the semiarid sector of northeastern Morocco. The altitudinal range of at least three and possibly eight trees extends above the highest peaks of the Rif chain (table 1). Edaphic factors impose some limitations. The cork oak will not grow on calcareous soils, and most forest species are excluded from poorly drained alluvium. Nevertheless, areas that are barren of trees as a result of natural causes constitute only a small part of this zone.

Most of the forest species common in northern Morocco are endemic to the Mediterranean region; a few belong more specifically to the western province of that region. *Quercus coccifera*, *Quercus Ilex*, *Pinus halepensis*, *Arbutus Unedo*, and a number of prominent Moroccan shrubs are spontaneous in most of the

[1] Charles Killian, "Plantes fourragères-types des hautes-plaines algériennes," *Annales de l'Amélioration des Plantes*, 4 (1954), 505–527.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

137 On protected sites, zizyphus and sumac (*Rhus pentaphylla*) form a thicket. In areas where zizyphus and sumac are mixed with *Pistacia atlantica*, the thorn scrub formation could be described as a thorn forest. Fields that have been fallow for several years are covered with *Asphodelus microcarpus*, *Marrubium alysson*, *Fagonia cretica*, and *Lycium intricatum* as well as the ubiquitous zizyphus. Alfa grass (*Stipa tenacissima*) covers part of the area between Ikibdhanen and Kar-Kar. Alluvial soils in the same general area are covered with esparto grass (*Lygeum spartum*) and dwarf sage (*Artemisia herba alba*). The areas occupied by these three species may be advanced colonies of the steppe formations of the upper Moulouya Valley and the Algerian Hauts-Plateaux.

Forest Formations

As figure 8 indicates, most of the forest species in northern Morocco belong to the families Pinaceae and Fagaceae. Two evergreen oaks dominate the latter group: the holly or holm oak (*Quercus Ilex*) and the cork oak (*Quercus Suber*). The wide range of the holly oak is indicative of its edaphic and climatic tolerance (fig. 7). In northern Morocco it is found from an elevation of about 500 meters up to the crest of the Rif chain. It is mixed with cedar and fir above 1,500 meters and with zizyphus in the semiarid region east of Alhucemas. *Quercus Ilex* may appear as a tall tree, but most specimens show the damaging effects of fire, cutting, and browsing. The holly oak is certainly a forest species, but it would be misleading to speak of forests of this tree. The area delimited in figure 8 merely indicates the zone in which specimens of this species are numerous. Many specimens are only two meters high. Emberger estimates that *Quercus Ilex* is spread over 700,000 hectares of Morocco, and that this territory may represent less than half of the primordial range.[a]

[132] The effective limit of the cork oak nearly coincides with the 400 mm. isohyet. *Quercus Suber* appears on schist in the highlands of Ghmara and Sanhaja, on sandstone in the mountains west of Tetuán and Shawen, and on Pliocene dunes south of Larache. Cork forests are not found on residual soils weathered from limestone, or on heavy alluvial soils. Most of the eastern half of northern Morocco is too dry for the cork oak. A single stand occurs in the highlands east of Wad [132] Nkour, where the orographic mechanism produces rainfall heavier than is observed in the neighboring lowlands.

The natural form of the cork oak is that of a large tree with a short trunk and spreading crown. Specimens of this form are rare today. Tall trees develop from seed regeneration, whereas most trees have a lateral growth that results from sprouting. The latter habit indicates a history of abuse, whether by cutting, burning, or browsing. Undisturbed forests usually have a shaded floor with little underbrush, but cork trees are more commonly accompanied by a number of shrubs. The faithful companion of *Quercus Suber* in northern Morocco is the woody briar *Erica arborea*, which also avoids calcareous soils. Under conditions of extreme degradation, the quick-seeding Cistaceae and the aggressive palmetto are more prominent than other undergrowth. Frequent disturbance, especially

[222] [113] l'ancien monde et l'utilisation de leurs fruits," *Revue de Botanique Appliquée et d'Agriculture Tropicale*, 27 (1947), 470–482.

[a] Emberger, *Les Arbres du Maroc*, p. 117.

A, B, [See pp. 24 & 20 respectively--Analyst]

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

CHAPTER III

CULTURE HISTORY PRIOR TO EUROPEAN INTERVENTION

FOR THE POPULATIONS and civilizations that reached it, Morocco was a cul-de-sac. Every movement came up against the Atlantic barrier and was retarded by the hostile environment of the Sahara. During the Pleistocene epoch and, indeed, during the first millennia of Recent geologic time, Morocco was a redoubt in which outmoded ways of life perfected themselves in isolation. The descendants of the Neolithic farmers remained dependent on stone tools three thousand years after the Egyptians, at the other end of the Mediterranean, had begun to use metal. Basically, the Stone Age cultures still persist, in spite of Phoenician, Roman, Arab, and European influence.

The historic accounts of the Canary Islands are of special interest. When the Norman and Spanish conquerors reached the Canaries a few generations before the discovery of America, the islanders spoke a Berber dialect and still retained their Neolithic culture. They used stone tools, and fashioned implements from wood, horn, and shell. They produced crude and underfired pottery in the Neolithic style, and their textiles were plaited matting and basketry. Their clothing was of cured goatskin, and their houses were made of stone, pine timbers, and earth. They raised pigs, dogs, sheep, and goats, and grew barley and wheat. They knew how to preserve meat by drying and milk by making cheese. Add metal, weaving, and the crops and animals introduced from southwestern Asia and the Americas, and this outline of material culture is little different from that of an isolated Moroccan village of today.[1]

THE PROBLEM OF CLIMATIC CHANGE

A mass of circumstantial evidence suggests that Barbary has become drier since the time of the Roman occupation. The impressive ruins of Thamugadi (Timgad) and the great amphitheater of Thysdrus (el-Jem) now stand on desolate plains. The ancient seaports of Leptis Magna and Sabratha were found buried under an immense drift of sand. Mosaics and historical records tell of the presence in Roman Africa of elephants, lions, and other wild animals now confined to the tropical zone. Further examples of change presumed to be a result of desiccation could be cited, but these suffice to illustrate the type of evidence that impresses the traveler.

It cannot be denied that the landscape of northern Africa has changed since classical time, but the thesis of a climatic explanation of this change is difficult to defend. Most of the evident deterioration can be traced to neglect or destruction by man. Aqueducts, dams, and cisterns made possible the building of the now dead cities. With the collapse of the Pax Romana, marginal land dependent on irrigation went out of cultivation. Burning, cutting, and overgrazing

[1] Leonardo Torriani, *Die kanarischen Inseln und ihre Urbewohner;* trans. from the MS of 1590 by D. J. Wölfel (Leipzig: K. F. Koehler, 1940), Vol. VI of *Quellen und Forschungen zur Geschichte der Geographie und Völkerkunde.* C. S. Coon, in *Caravan: The Story of the Middle East* (New York: Henry Holt, 1951), pp. 36–40, calls attention to the Canary Islanders as "Berbers" unaffected by foreign influence.

7: Mikesell K-4,5 (1955-1957) 1961 MX3 Rif MX3

favored the propagation of xerophytic and heliophilous plants, and thus enhanced the illusion of desiccation. The "tropical" animals pictured on Roman mosaics did not die out as a result of climatic change; they were exterminated by man. The last elephants probably disappeared in Roman time. Lions may have been in the Atlas Mountains until about 1900. Ostriches, antelopes, and other animals nearly extinct in the Sahara still survive along the upper reaches of the Saqiyah al-Hamra in Río de Oro. The arguments for and against desiccation in historic time have been debated at length, and the weight of evidence is against a significant change in climate.[4]

The Berbers

The autochthonous inhabitants of northern Africa are usually described as Berbers. In classical times this appellation, derived from Greek and Latin roots meaning "barbarian," was applied to individuals or groups living beyond the Orbis Romanus. Today Berber is applied as a general name, devoid of pejorative implication, to North Africans who are not Arabized. The people thus designated refer to themselves as *imazighen* (nobles). The European term serves a useful function if its application is determined by the persistence of Berber speech, but confusion results when it is given racial, moral, or psychological connotation. Romantic notions of the Berbers as "noble savages" may be found even in serious works.[5] The French had an instinctive liking for the Berbers, because they seemed more European than Oriental in physical appearance and mental outlook. But the policy of encouraging Berber languages, Berber law, and Berber traditions, as a means of checking Arab nationalism, had at best only temporary success.

The racial characteristics of the Berber-speaking peoples are far from uniform. In the Kabylie, Aurès, Rif, and Atlas mountains one may see dolichocephalic people, with blue or gray eyes, and light brown or even blond hair. Other Berber-speaking peoples are darker and have round heads. Many Berbers are of the classical Mediterranean type. The Tuareg form another group, tall and lean, with short bodies and long limbs. The physical characteristics of the indigenous peoples of northern Africa seem to have resulted from the crossing of several races during widely separated periods.[6]

The confusion surrounding the meaning of "Berber" is further complicated by the fact that French colonial policy called for a division of Morocco into Berber and Arab territories, each with a distinct system of local government and law.[7] In unreasoned protest against the implications of this policy, some authors, sympa-

[TEXT CONTINUED ON PAGE 35]

[4] There are many discussions of this problem: Stéphane Gsell, *Histoire ancienne de l'Afrique du Nord* (Paris: Hachette, 1913–1928), I, 44–99; Jean Despois, *La Tunisie orientale: Sahel et Basse Steppe* (Paris: Les Belles Lettres, 1940), pp. 237 ff.; Rhoads Murphey, "The Decline of North Africa since the Roman Occupation: Climatic or Human?" Association of American Geographers, *Annals*, 41 (1951), 116–132; and K. W. Butzer, *Studien zum vor- und frühgeschichtlichen Landschaftswandel der Sahara* (Wiesbaden: Franz Steiner, 1958), pp. 5–17.

[5] For an interesting example of Berber romanticism, see Edouard Brémond, *Berbères et arabes: la Berbérie est un pays européen* (Paris: Payot, 1950).

[6] C. S. Coon, "Tribes of the Rif," *Harvard African Studies*, 9 (1931); L. Cabot Briggs, "The Living Races of the Sahara Desert," Peabody Museum of Archaeology and Ethnology, *Papers*, 28 (1958).

[7] As recently as September, 1956, pamphlets urging the Berber tribes to revolt against "Arab imperialism" were distributed in Morocco. The Moroccan police promptly established that these tracts had been typed and mimeographed on machines used by an organization known as the "Présence Française." For the text of one of the tracts and the Moroccan reaction to it, see *Al-Istiqlal*, September 7, 1956, and the *Tangier Gazette*, September 14, 1956.